Vol. 105 No. 2 JANUARY 26, 1946

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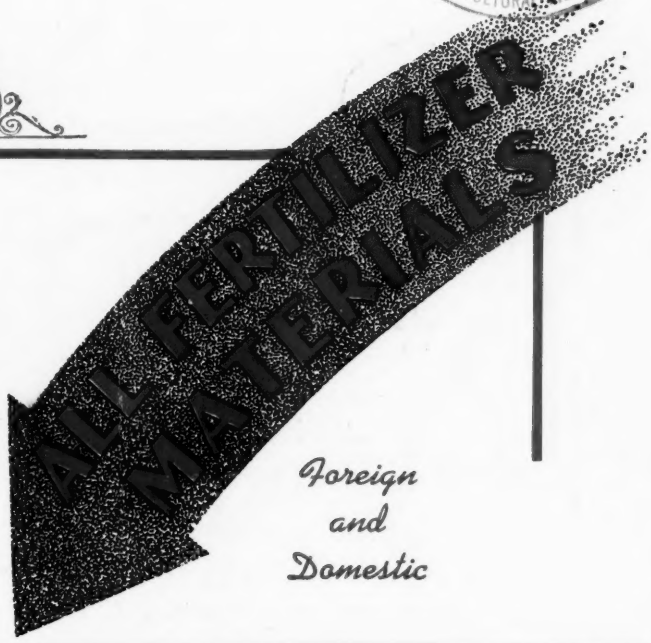

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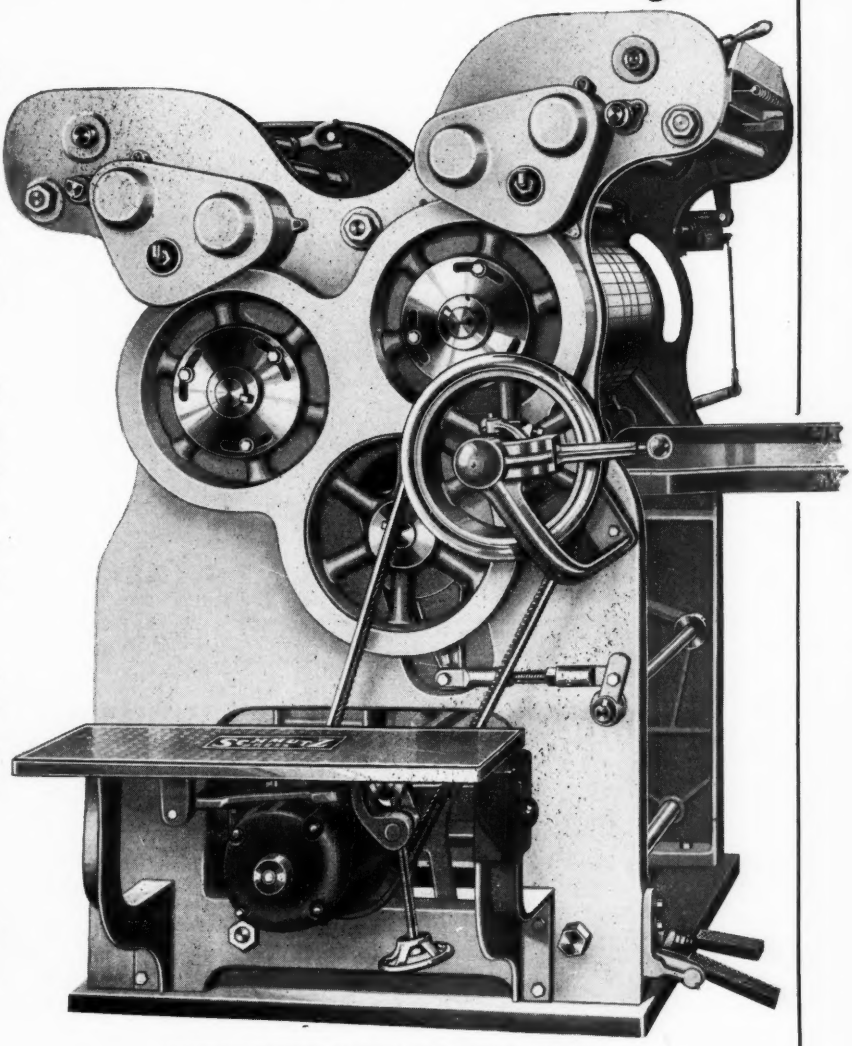

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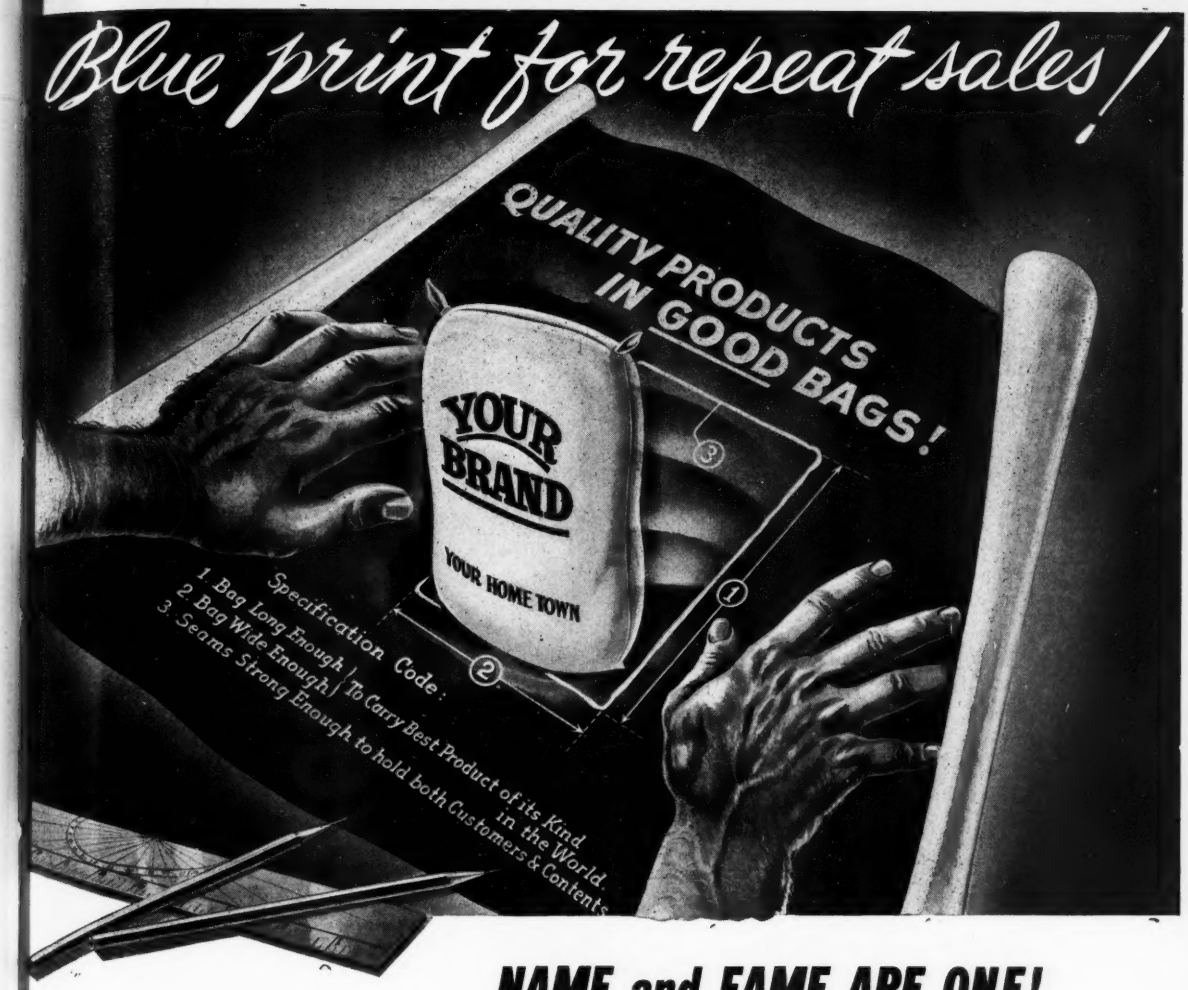
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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 104 JANUARY 26, 1946 No. 2

World Fertilizer Situation Critical

Combined Food Board Reports Shortage in All Fertilizer Materials. United States Supplies Almost Adequate. Continuation of Export Controls Recommended.

SERIOUS shortages of commercial fertilizers for 1946 world food production and a continuing tight supply position were reported on January 15th to the U. S. Department of Agriculture by the Combined Food Board.

Exclusive of needs in the Far East, which are large, the over-all world shortage of plant foods (nitrogen, phosphoric acid, potash) was estimated by the Committee on Fertilizers of the Food Board at approximately 1,000,000 short tons.

The facts of essential need and shortage dominate the current world fertilizer outlook, it was explained. Requirements for fertilizers in liberated countries since the end of the war intensified already existing shortages and have given rise to new problems in equitable distribution among claimant countries. Increased production resulting from reconversion of war plants from munitions, here and abroad, has not nearly equalled the increased requirements.

Two broad methods of meeting world fertilizer shortages were outlined: Raise production to the maximum and ship materials from surplus supply areas to the deficient areas. Reduce the general level of plant food consumption in all countries.

It was explained that there are practical limits beyond which either policy cannot be implemented this crop year. Emphasis was placed on the necessity for maintaining the "greatest possible equity in distribution on the basis of agricultural needs and humanitarian interests."

Coincident with the report, the Department of Agriculture stated that while a tight supply situation will exist in the United States this year, available supplies of plant food should be sufficient to maintain high level food production.

Prospective supplies of fertilizer which should be available to American farmers for 1945–46 are as follows: Nitrogen, about the same total as a year ago, with substantially less Chilean nitrate of soda, but more domestic synthetic nitrogen. Total potash supply, about the same as last year, but with less in sulphate form. Phosphate supplies, somewhat more than a year ago, with the increase coming mainly in the form of ordinary superphosphates.

With world requirements of potash currently estimated at 2,030,000 short tons K_2O, and supplies estimated at 1,852,000 tons, there is a deficit of approximately 178,000 tons. The smaller size of the potash deficit is due in part to the increase in American production of K_2O for agricultural purposes, and the resumption of exports from France to other European countries now that the French mines are open again. Nevertheless, demand in North America still exceeds supply, and European requirements will not be adequately met until supplies from Germany are once again available. European soils have been well supplied with potash during the war years, however, so that in general a shortage of potash will not be as serious as the shortages of other fertilizer materials.

Commercial Fertilizers Essential in World Crop Production

Maximum and economical production of food, fibre and other crops depends, among other things, on adequate supplies of commercial fertilizers. In fact, vast acreages of

arable land now producing food crops could not be farmed at all without fertilizers.

The world level of food, fibre, meat, wool, and milk production would be dangerously lowered without the use of millions of tons of fertilizer available for crop production. According to figures published by the First World Fertilizer Congress, world fertilizer consumption for 1936 was 41,929,500 metric tons, containing 8,561,750 tons of plant food, for which the farmers of the world paid approximately $1,000,000,000. The production and consumption of fertilizers in some countries have, however, practically doubled since that time.

In other countries wartime shortages of plant nutrients have adversely affected crop production and hence the dietary standards of the people. An outstanding instance is the lack of essential phosphorus in Europe. This was due to the cutting off of the supply of rock phosphate from North Africa. To a somewhat lesser degree, due to lack of shipping, the wartime supply of phosphates for Australia and New Zealand—cut off from their normal adjacent sources of phosphate rock supply in Oceania—was materially reduced.

In recent months the lack of coal and other limitations of power have so restricted the production of fertilizer nitrogen that shortages of this element are expecte to bear most heavily upon 1946 crop returns.

Under present conditions there are some 15 to 20 major fertilizer producing countries. Not all of these countries produce sufficient fertilizer materials to provide both for their own needs and still have an excess for export. Some countries may export nitrogen for instance, but have in turn to import replacement tonnages from other countries. The chief producing and exporting countries are given:

Nitrogen is produced in practically all industrialized countries but the largest producers among the Allied Nations, excluding Russia, are the United Kingdom, Norway, Belgium, France, and the Netherlands. Currently the chief exporters are Chile, Canada, the United Kingdom, and Norway. Belgium and the Netherlands, net exporters in normal times, are for the time being importers. Norway will this year produce about 94,000 tons nitrogen—a great help in meeting European requirements.

Even though production has been materially increased, the United States is a deficit country in nitrogen production and depends on imports from Chile and Canada to meet increasing demands.

Phosphate Rock is produced chiefly in the United States and North Africa, but also in Egypt, the U. S. S. R., Netherlands West Indies, and Oceania. The Oceanic deposits which normally supply around 1,500,000 tons annually of high grade rock have, with the exception of Makatea, been in Japanese hands and suffered extensive damage. They will not be major sources for perhaps two or three years.

Soluble Phosphates are produced in practically all fertilizer consuming countries and, with the exception of the U. S. A. and U. S. S. R., from imported phosphate rock. The European countries depend essentially on North Africa for the supply of phosphate rock, the output of which is falling behind schedule.

Potash is produced principally in the United States, France, the U. S. S. R., Spain, Palestine, and Germany. At present the United States supplies the countries of the Western Hemisphere with potash, and the European producers and Palestine supply the Eastern Hemisphere.

World Requirements, Fertilizers, 1945–46.—The current fertilizer year is from July 1, 1945, to June 30, 1946. For this period the estimated fertilizer requirements of some 80 countries, as of October, 1945, are given below. The figures are in short tons of N, P_2O_5, and K_2O:

	Requirements	Estimated Supply	Shortage
Nitrogen	1,850,000	1,530,000	320,000
Phosphates:			
Soluble and rock	3,800,000	3,300,000	500,000
Potash	2,030,000	1,852,000	178,000

In terms of fertilizer materials commonly used the nitrogen shortage is equivalent to 1,600,000 tons of sulphate of ammonia; the phosphate shortage to 2,500,000 tons ordinary superphosphate, 20 per cent P_2O_5; and the potash shortage to 356,000 tons of muriate of potash, 50 per cent K_2O.

Requirements of the Far East.—The above statement of requirements and allocations does not take into account the fertilizer needs of the Far East which since V-J Day are now coming in from China, Netherlands East Indies, the Philippines, and French Indo-China. Supplies of nitrogen are particularly wanted for the fertilization of sugar, rice, and other important crops. Again this demand for more nitrogen intensifies the already existing shortage estimated at 320,000 tons N.

In prewar times the Japanese Empire, including Kwantung leased territory and Korea, had a capacity of around 400,000 tons

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Rapid Soil Tests Furnish One of the Implements for Increasing Crop Yields*

By BENJAMIN WOLF

Seabrook Farms Company, Bridgeton, N. J.

ONE often hears the value of rapid soil testing questioned, despite the fact that modern soil testing on a large scale has been conducted for more than a decade. Many thousands of samples from various locations in the United States have been analyzed. Several commercial organizations and nearly every experiment station in the country are now conducting rapid soil tests in great numbers. In some cases, the soil-testing services at the experiment stations have been established at the request of farmers within the state. In general farmers have been quick to take advantage of the tests and have come to depend upon the results.

It is surprising, therefore, that with this mass acceptance of rapid soil testing there still should be questions as to whether it is worth while. Many of these questions stem from the fact that within the questioner's experience, rapid soil tests for one reason or another have not performed satisfactorily. There have been various reasons for this disappointment but one of the foremost has been the failure to adapt a set of procedures suitable for the soils and crops investigated.

In using rapid soil tests, the G. L. F.-Seabrook Farms Raw Products Research Division has attempted to adapt a particular set of procedures for determining whether nutrient levels of certain soils were suitable for particular crops under study. This has meant not only a study of the soil but the crop as well. Indications are that this particular adaptation of soil tests is paying dividends in various ways of increasing returns from growing crops. It may be advantageous, therefore, to carefully consider how soil tests are being put to work in this laboratory. Such an examination of one laboratory using rapid soil tests may help to assess the true value of soil tests in general.**

Result of Analyses

This laboratory has analyzed approximately 10,000 soil samples in the past four years, representing approximately 25,000 acres of South Jersey farms. About 15,000 of these acres are operated by Seabrook Farms. The others are operated by individual farmers who are patrons of the G. L. F. cooperative and/or supply vegetables to the packing division of Seabrook Farms (Deerfield Packing Company). For the majority of this acreage, fairly detailed records as to treatment and yields are available for a number of years. These records have given the opportunity to make needed correlations so as to evaluate the soil tests in practical terms.

It might be advantageous to point out some of the measures that we have had to adopt to make the rapid soil tests give accurate and useful information. These measures have affected the accuracy of all three phases of soil testing; namely, sampling, determination of nutrients, and the interpretation of results. Considerable work remains to be done in this direction, but we feel that sufficient work has already been accomplished to make rapid soil tests, at least for this area, a valuable tool for obtaining maximum returns from vegetable farming.

Representative Soil Samples

In setting up standards for sampling, it was realized that a soil analysis, no matter how carefully it was performed, could correct for inaccuracies in sampling technique. Also, that the average soil is a heterogenous mass from which it is difficult to obtain a truly representative sample.

In the beginning, we clearly outlined our objective to be the sampling of a field in such a manner so that it could serve as a basis for the practical applications of soil amendments. It had to be sampled so that results of a

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*Reprinted from "Better Crops with Plant Food," December, 1945.

**It would be well to point out here that the Research Division uses various means of gathering information concerning crop production. Rapid soil testing is but one of the methods which include rapid plant tests for both soluble and total nutrients, pot and field experiments, and longer soil and plant test procedures. Only rapid soil tests are being considered in this paper because they have been subjected to the most criticism.

duplicate sample taken immediately would not suggest marked changes in the rate or kind of application.*

This has meant limiting the size of the area represented by a sample to about five acres.** About a dozen borings are composited to form one sample representative of the area. All atypical areas, such as knolls, depressions, eroded strips, etc., are omitted. If these areas are large enough to be handled as individual units, they are sampled separately; otherwise they are ignored, lest a boring from such an area markedly affect the results of an entire sample. On the same basis, soil has not been collected from portions of the row where bands of fertilizer have been located. Fortunately, most of the fertilizer in this area has been broadcast before or after plowing, with a resulting uniform distribution of nutrients. Where banding or row fertilization was the common practice, samples have been collected after plowing or considerable cultivation had taken place, in order to insure mixing of fertilizer with the soil. By observing these few precautions, it has been possible to collect samples which definitely meet our objective as stated above.

Procedures Must Be Accurate

In putting soil tests to work, it has been necessary to focus considerable attention to the accuracy of the chemical determination. This accuracy is dependent upon many factors, such as the effectiveness of the extracting solution, temperature of reaction, order of mixing reagents, rate of shaking, presence of interfering substances, length of time of standing before reading, and individual differences in reading the tests.

Samples have been air-dried and sieved to remove stones and debris before making the various tests. Tests for soluble nitrogen fractions are run on fresh samples as soon as possible after they are received from the field.

The extraction of nutrients has been accomplished by the use of Morgan's extracting solution (*2*)† which seems to be well adapted for the Coastal Plain soils of low exchange capacity in South Jersey. A definite time interval (one minute) of shaking soil and extracting solution has been used. The use of activated charcoal as suggested by Peech and English (*3*) has eliminated the off colors and interferences due to soluble organic matter.

A pH meter using a glass electrode has been used to accurately measure pH. A soil suspension of one part soil to one part water is allowed to stand at least one hour and not more than eight before the measurement is made.

Organic matter is determined by a modification of the Schollenberger method, using the reaction of concentrated reagents to produce the heat (*4*). It has been found that some sodium dichromate and ferrous ammonium sulphate must be drawn off and discarded each time a new batch is determined. These solutions change in strength when in contact with rubber connections and solution within the siphon will have a different strength than the remainder in the bottle.

The tests for the various nutrients are based on Morgan's procedures but have been modified in various ways. Some of these modifications have been published (*5*) (*6*).

Use has been made of the phenol-disulphonic acid reaction to determine nitrates accurately. A quicker method using Brucine has also been suggested.

Ammonia is determined by Graves reagent. This reagent has an advantage over usual Nessler reagents in permitting the determination of ammonia in the presence of large quantities of salts.

In the phosphorus determination, accuracy has been increased by the use of amino-naphthol-sulphonic acid solution as a reducing agent. It has the advantage of not deteriorating as rapidly as stannous chloride solutions. Likewise, it is possible to supply a definite amount of reducing agent which often is not accomplished by the use of powdered stannous oxalate or tin rods.

In the potassium test, greater accuracy has been obtained by the use of the cobaltnitrite reagent suggested by Peech and English (*3*) and by the use of formaldehyde to eliminate the interference of ammonia (*1*). The effect of speed of mixing alcohol with other reagents has been controlled by adding the alcohol from an automatic, 10 ml. pipette placed at a standard height above the vial. This, in addition to inversion of the contents after stoppering, has assured uniform mixing which is so essential for accurate results.

(Continued on page 22)

*This permits a variation of about 100 lbs. of fertilizer, about 500 lbs. of liming materials, and about a half ton of organic materials per acre since our present machinery cannot spread these materials with any greater accuracy.

**This is about the smallest area in most fields that can be handled separately and practically under our present system. In old fields, the field is divided into five acre areas and sampled. Where small fields have been brought under company control and combined into one large field, it has been necessary, for several years, to sample the field on the basis of the old divisions.

†Numbers in parentheses refer to literature cited at end of article.

Dr. W. H. Ross Joins N. F. A. Staff as Consultant

Dr. W. H. Ross, who recently retired from active service as principal chemist of the Division of Soils, Fertilizers and Irrigation of the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. D. A., has joined the staff of the National Fertilizer Association as consultant. He will cooperate with industry chemists, State chemists, State control officials, and the Association of Official Agricultural Chemists in working on certain analytical problems of fertilizer chemistry still unsatisfactorily solved. Dr. Ross has also been appointed collaborator by the Division of Soils, Fertilizers and Irrigation, and is president of the Association of Official Agricultural Chemists.

American Plant Food Council Plans Future Program

The board of directors of the American Plant Food Council met in Washington on January 16th to review the activities of the organization during the past six months and to lay plans for the future program. President Clifton Woodrum, who has resigned from Congress to devote his entire time to the Council, presided.

It was decided to hold the first annual meeting of the entire membership at the Homestead, Hot Springs, Va., on June 23, 24 and 25, 1946.

The resignation of J. Albert Woods from the board and the executive committee was accepted. James F. Doetsch, of the Chilean Nitrate Sales Corporation, was elected to membership in the board, and F. S. Washburn, of American Cyanamid Co., was appointed on the executive committee.

There was considerable discussion of the Kefauver bill recently introduced in Congress, which would put the government in the business of fertilizer production and distribution.

Alabama Pasture Field Day

About 350 farmers and others interested in soil conservation attended the field day on January 8th as guests of the Avondale Mills, Sylacauga, Ala. A comprehensive tour of pastures and grazing crops included a fertilized crimson clover and rye grass pasture which was carrying one cow per acre, oat and barley pastures available for grazing, and striking examples of the saving in feed and costs through winter cover crops and other forms of pastures.

In a speaking program after a barbecue lunch, O. C. Medlock, State conservationist, stressed that Alabama had fertilized and seeded over a million acres of pastures in 1944 and hoped to ultimately improve 5,000,000 acres of pasture and hayland, or about 40 per cent of the total. P. O. Davis, Alabama extension director, emphasized that in planting the right seed and using fertilizer on pasture crops, cows were doing most of the work, it was cheaper than with other forms of feeding, and more nutritious milk was being produced.

Donald Comer, chairman of the board of the mills, pointed out that fertilized grass gives twice as much beef as unfertilized grass, that the same system also worked on fertilizing fish ponds, and that more fertilizer should be used on row crops as "it takes just as long to walk down a rich row as a poor row."

A Few Grades Meet All Ohio Needs

In prewar years, Ohio farmers could choose from among 84 different analyses of fertilizers but in wartime this choice was limited to 14 analyses; and Earl Jones, extension agronomist, Ohio State University, says this limitation was such a good thing it should be continued voluntarily.

Mr. Jones explains that competition in the fertilizer business in former years led to the making of many kinds which varied only slightly in content of plant foods, and there also was a tendency to make low grade fertilizers which could be sold on a bargain basis. The Ohio laws place one limit on fertilizer analyses and that is the total of plant food must be 18 per cent or more. The fertilizers now sold in Ohio average a little more than 20 per cent actual plant food.

Mr. Jones claims all fertilizer requirements of Ohio soils and crop production can be met by selection from 14 analyses of fertilizer, and three of those are merely multiples of lower grades. He says it is much easier to choose the right fertilizer from among 14 than from a list of 84, and there are considerable savings to manufacturers when the number of analyses is reduced.

The list recommended for Ohio is 0–14–7, 0–12–12, 0–10–20, 0–9–27, 2–12–6, 3–12–12, 3–9–18, 4–12–8, 5–10–10, 8–8–8, 10–6–4, 0–20–20, 0–20–10, and 3–18–9. The last three multiple grades will not be available in quantity until manufacturers can get 43 per cent superphosphate.

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1945 Tag Sales 9% Above 1944

The tonnage of fertilizer used by the farmers in this country in each of the last seven years was larger than the tonnage used in the preceding year. A new all-time peak in fertilizer consumption was reached successively in each year from 1940 through 1945, it is pointed out by the National Fertilizer Association. American farmers were called on during the war years to raise their production of foodstuffs to the highest level in history. This objective was accomplished with the help of the increasingly large quantities of commercial plant food made available by the fertilizer industry.

Detailed information on 1945 fertilizer tonnage in the entire country will not be available until the National Fertilizer Association completes its comprehensive annual survey several weeks hence. Tonnage in 17 states in 1945, as indicated by the sale of tax tags, exceeded 1944 by 672,000 tons, or 9 per cent. In view of this increase in these states, which account for two-thirds of total tonnage in the entire country, the increase in the country as a whole was no doubt a significant one. In recent years the increase in the 17 states has not been as great as in the other and newer fertilizer-using states.

The National Fertilizer Association reports that aggregate 1945 tax tag sales in the 17 reporting states represented 8,254,000 tons. Sales for the year exceeded by more than 55 per cent the average sales in 1936–1938, the three prewar years. Twelve of the 17 states reported increases from 1944 to 1945. Small declines occurred in the other three states: Mississippi, Arkansas and Kansas. Sales in North Carolina were more than 1½ million tons and Georgia sales exceeded a million tons for the third consecutive year. Sales in those two states in 1945 were larger than were sales in the entire country in the early years of this century.

December sales were moderately larger than a year earlier, the increases amounting to 2 per cent in the South and 18 per cent in the Midwest.

Sales in the July–December period, the first six months of the fiscal year, were 10 per cent larger than in the corresponding period of the preceding year, with increases reported by nine states and decreases by eight. The war-induced program for the early buying of fertilizer has resulted in substantially increased quantities of fertilizer being purchased prior to December 31st for use during the spring

season. Consequently, changes in calendar year statistics do not necessarily reflect changes in consumption in the years covered by those statistics. There is greater comparability in the statistics on a fiscal, or July-to-June, basis.

FERTILIZER TAX TAG SALES

Compiled by the National Fertilizer Association

State	December			July–December			
	1945 Tons	1944 Tons	1943 Tons	% of 1944	1945 Tons	1944 Tons	1943 Tons
Virginia	25,952	40,453	38,957	111	207,367	186,632	168,965
North Carolina	179,966	143,379	141,958	114	364,631	319,090	334,128
South Carolina	63,465	88,390	73,590	93	168,850	180,960	195,425
Georgia	57,720	68,110	87,511	113	227,739	201,231	224,181
Florida	91,478	80,246	63,530	125	466,700	371,989	342,089
Alabama	36,650	54,050	82,000	90	117,200	130,300	163,300
Mississippi	50,750	28,750	42,194	81	101,350	124,743	163,645
Tennessee	3,500	11,475	4,333	75	54,681	73,054	47,871
Arkansas	12,500	9,500	8,200	86	28,500	33,100	41,890
Louisiana	15,550	4,800	21,500	136	113,224	83,365	72,230
Texas	14,630	10,885	23,110	121	83,743	69,133	58,600
Oklahoma	760	607	2,500	91	8,660	9,557	6,435
Total South	552,921	540,645	589,383	109	1,942,645	1,783,154	1,818,759
Indiana	60,098	50,271	100,300	119	319,806	269,592	263,255
Illinois	25,850	22,425	8,249	129	114,825	89,085	44,551
Kentucky	11,338	8,382	4,650	99.9	63,951	64,034	48,787
Missouri	12,620	11,418	5,875	98	70,026	71,335	51,896
Kansas	525	750	45	115	17,280	15,020	13,034
Total Midwest	110,431	93,246	119,119	115	585,888	509,066	421,523
Grand Total	663,352	633,891	708,502	110	2,528,533	2,292,220	2,240,282

ANNUAL FERTILIZER TAX TAG SALES

Compiled by the National Fertilizer Association

(Short Tons)

	3-Yr. Ave. 1936–1938	1941	1942	1943	1944	1945
Virginia	410,703	399,377	420,668	487,038	515,578	594,829
North Carolina	1,126,780	1,150,343	1,243,612	1,414,454	1,369,751	1,512,013
South Carolina	686,216	729,447	698,704	890,493	799,083	822,875
Georgia	773,084	806,326	852,765	1,083,488	1,039,679	1,105,564
Florida†	549,161	597,508	589,610	719,290	824,500	908,651
Alabama	541,948	581,500	574,150	780,050	674,400	722,500
Mississippi	296,734	368,667	377,082	495,239	417,624	403,557
Tennessee	128,976	141,461	174,298	230,818	271,545	277,090
Arkansas	61,803	125,100	140,458	182,865	131,083	126,650
Louisiana	140,991	182,010	173,241	214,768	216,245	239,560
Texas	79,743	142,666	133,974	186,510	204,509	229,828
Oklahoma	6,968	12,950	8,752	21,488	20,708	25,072
Total South	4,803,107	5,237,355	5,387,314	6,706,501	6,484,705	6,968,189
Indiana	254,690	340,161	436,679	496,380	480,421	548,295
Illinois	41,980	63,004	82,526	111,315	185,565	257,014
Kentucky	105,481	121,976	146,420	164,038	246,119	282,134
Missouri	82,131	86,964	70,937	95,592	146,504	160,024
Kansas	14,846	19,186	11,415	16,324	38,521	38,145
Total Midwest	499,128	631,291	747,977	883,649	1,097,130	1,285,612
Grand Total	5,302,235	5,868,646	6,135,291	7,590,150	7,581,835	8,253,801
Total U. S. Fertilizer Consumption*	7,568,000	9,183,000	9,949,000	11,463,000	12,072,000	—

†Revised, 1941 through 1944, by eliminating the tonnage of raw phosphate rock and liming materials.

*Including fertilizer distributed by Government agencies.

Tobacco Fertilizer Experiments in Connecticut

In the annual report of the Tobacco Substation at Windsor, Conn., issued by the Connecticut Agricultural Experiment Station (Bulletin 487), the results of several series of experiments on the use of different kinds of fertilizer materials are given. The following is a summary of these reports.

Efficiency of Nitrogen in Oil Seed Meals

The shortage of cottonseed meal during the war years prompted experiments by T. R. Swanback, on the use of castor pomace and soybean meal as a source of nitrogen on the 1944 tobacco crop. The amounts of nitrogen per acre were: 200 lb. from cottonseed meal, 160 lb. from castor pomace, 180 lb. from soybean meal. The relative crop values determined were as follows: cottonseed meal, 100; castor pomace, 99.5; soybean meal, 104.6. Over a five-year period, the differences were even less: cottonseed meal, 100; castor pomace, 101.5; soybean meal, 101.8. The results indicate that castor pomace may be used in the same quantity as cottonseed meal, and that 1,600 lb. of soybean meal may be substituted for a ton of either of the other two.

Band Application of Tobacco Fertilizer

The time-honored method of fertilizing tobacco in New England is to broadcast the fertilizer after the land has been plowed and harrowed. A further harrowing distributes the fertilizer through the upper six inches or less. With the increase in experiments on fertilizer placement, it was decided to see whether row (band) application would produce better quality and higher yields of tobacco, or would permit reduction in the quantity of fertilizer needed or the labor involved.

The experiment has been conducted over the four-year period 1941–1945, applying 2,500 lb., 2,188 lb., and 1,875 lb. per acre of 8–4–8 mixture by both broadcast and band application. Some of the broadcast applications were made "early" (one or two weeks before setting out the plants) and some "late" (immediately before or at the time of planting). The results are summarized as follows:

	Lb. of Fert. per Acre	Yield in lb. per Acre	Grade Index	Crop Index
Early broadcast..	1875	1888	.368	.695
	2188	1982	.394	.782
	2500	1910	.397	.758
Late broadcast...	1875	1933	.395	.764
	2188	1955	.410	.801
	2500	2034	.418	.851
Late row.....	1875	1912	.426	.815
	2188	1951	.434	.847
	2500	2113	.446	.942

A study of the results leads to the following conclusions:

1. Applying the fertilizer to the soil one or two weeks before setting the plants does not increase the yield or improve the grading. It may just as well be applied at the convenience of the grower up to the date of setting the plants.
2. Band application of the fertilizer increases the grading but not the yield.
3. When the fertilizer is applied in bands, the amount may be reduced below the requirement for a broadcast application without impairing the cash value of the crop.
4. During a dry season there is danger of root injury from a too strong fertilizer solution in the soil if the fertilizer bands are within four inches of the row. Root-burned plants either die or start slowly, necessitate restocking and result in uneven stands. Root injury could probably be reduced by placing the fertilizer bands farther away from the plants but this has not been tested.

(Continued on page 26)

BRADLEY & BAKER

FERTILIZER MATERIALS - FEEDSTUFFS

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504 Merchants Exchange Bldg., St. Louis, Mo.

FERTILIZER MATERIALS MARKET

NEW YORK

Steel and Meat Strikes Seriously Affect Supplies of Some Fertilizer Materials. Demand Exceeds Supply in Practically Every Material. Nitrate of Soda Being Allocated by Suppliers. Superphosphate and Potash Markets Tight.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, January 24, 1946.

With the active shipping season for mixed goods getting under way, the industry is notably affected by two of the great strikes which occupy the nation's headlines. The steel strike, which it was hoped could be averted, has closed down a number of the by-product coke ovens, which will further aggravate the shortage of sulphate of ammonia for this season's business. To a less extent, the fertilizer industry is handicapped by the strike at the large packing houses, although most of the by-product materials have been going to the feed market.

Reports indicate that farmers are taking delivery of their fertilizer earlier than usual this year. The campaign of the fertilizer associations and the U. S. Department of Agriculture is getting results in spreading the shipping season over a longer period and thus avoiding the usual spring bottleneck.

Sulphate of Ammonia

Just how much sulphate of ammonia will be available this season is highly problematical. Even before the steel strike closed some of the coke ovens, shipments on contracts were running a month or more behind schedule in some cases and consequently no reserves have accumulated at the producing plants.

Nitrate of Soda

The situation in nitrate of soda has tightened considerably. Farmers are ordering early and storing the material for use later in the spring. Imports have dropped because of the demands from Europe and domestic production has been handicapped by a shortage of soda ash. Up to now, all orders have been filled as received but suppliers are allocating future shipments to customers on the basis of last year's purchases.

Organic Materials

What little organic materials have been reaching the fertilizer manufacturers have been further curtailed by the packing house strike. Very little material is coming in from abroad and this is being taken by the feed producers.

Superphosphate

While the production of superphosphate has shown an increase in each of the past seven months, the supply is still short of the amount that the industry could use. Labor shortage still curtails the output in a number of plants and contracts are taking practically all of the current production. Concentrated superphosphate is still very tight with demand exceeding probable supply for the balance of the season.

Phosphate Rock

Present production of phosphate rock is going almost entirely to superphosphate producers in this country. The export demand last fall depleted reserve supplies and rock miners are now having all they can do to meet current demand. Some delays in shipments have been reported and the labor situation is still keeping production from rising to even higher levels.

Potash

While some shipments are running behind schedule, the supply for the current year should run about the same as last year, or even slightly higher. All current production is sold up to the end of the spring season and practically no resale material is in the market. The demand for fertilizers in Europe precludes any possibility of sizeable imports from that continent for some time to come.

ROBINS..FERTILIZER..RAYMOND SHIPPING SACKS are on the move;

North, South, East, and West, another beginning of a tremendous food production program is under way. And again Fertilizer will play an important part in increasing production.

Producers and users of Fertilizer both agree that Raymond Multi-Wall Paper Shipping Sacks make the job of packing, handling, and shipping easier.

Dust-proof, Sift-Proof, Water-Resistant, fast to pack, Raymond Shipping Sacks are ideally suited to Fertilizer packing and shipping problems. They are made in various sizes, types, and strengths, printed or plain, pasted or sewn.

THE RAYMOND BAG COMPANY
Middletown, Ohio

RAYMOND
MULTI-WALL *Paper*
SHIPPING SACKS

CHARLESTON

Shipments of Mixed Goods Improving. Shortage of All Materials Reported. Organics Extremely Scarce.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, January 21, 1946.

Mixed goods are beginning to move to the farm but shipments so far this season are behind last season on account of the slow movement during November and December.

Organics.—The shortage on these materials is becoming quite serious for there is nothing being offered and the indications are that this condition will continue for several months at least.

Sulphate of Ammonia.—It is now indicated that there may be practically no stock carried into 1946 and shipments on contracts still are far behind.

Dried Blood.—Only occasional lots offered at the ceiling, $5.53 per unit of ammonia ($6.72 per unit N) f. o. b. cars producing points. What little is being offered is being absorbed in the feed market.

Phosphate Rock.—Producers generally are closely sold up for the next six months.

CHICAGO

Demand for Fertilizer Organics Exceeds Possible Supply. Feed Material Producers Closed by Strikes.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, January 21, 1946.

Supply in the organic market remains unchanged with the demand exceeding possible supplies. Calls for bone meal continue but both steamed and raw are practically off the market.

The strike of the packing-house workers has shut down the feed-producing plants in the stockyards, which naturally leaves the supply and demand situations still further apart.

Ceiling prices are:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N); blood, $5.53 ($6.72 per unit N); dry rendered tankage, $1.25 per unit of protein, f. o. b. producing points.

Group Life Insurance for Bemis Bro. Bag Co. Employees

To bring additional security to Bemis Bro. Bag Co. employees and their families, a plan of group life insurance has been provided which became effective December 20, 1945. The plan, arranged through the Metropolitan Life Insurance Company, provides eligible Bemis employees with life insurance without cost and without medical examination. After one year of continuous service, employees are entitled to $500 of life insurance. After five years of continuous service, employees are entitled to $1,000 of life insurance.

This plan is somewhat unique in that the Bemis Company bears the entire cost of the insurance. In most such plans the employees bear a part of the cost.

N. C. Cotton Winner Grows Almost 3 Bales per Acre

By growing 7,080 pounds of lint cotton on five acres, George H. Blanton, of Rutherford County, won the North Carolina Five-Acre Cotton Contest and was awarded the state prize of $750 and the district prize of $350. The average production of the four leading contestants in each district was as follows: western district, 6,688 pounds of lint; central district, 4,954 pounds; eastern district, 5,587 pounds.

In preparing his soil, Mr. Blanton turned under a heavy crop of lespedeza in the fall. He made the seed bed in March and applied 600 pounds of 4–10–6 per acre with a grain drill in April. An additional 200 pounds per

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Ammonia Liquor :: Anhydrous Ammonia

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acre of 4–10–6 were used when the crop was planted on May 5th. A top-dressing of nitrate of soda, 200 pounds per acre, was applied when the plants were about 15 inches high.

As all contestants keep accurate records of all production costs, the figures of the winning crop are significant. Fertilizer costs were $88.40; land rent, seed, seed treatment and ginning, $188.90; labor expense, $382.11. His net return amounted to $1,442.82, or an average of $288.56 per acre.

The contest was sponsored by a number of business agencies interested in the future of cotton in North Carolina.

November Superphosphate

Production of superphosphate during November continued at the high level of October, according to the figures of the U. S. Bureau of Census. During the month, total production, figured on the basis of 18 per cent APA, amounted to 718,023 tons. This is a 2 per cent decrease from October which would be accounted for by the shorter month. It is, however, 18 per cent above the production figures for November, 1944. Both concentrated and base goods showed a marked increase over October. Shipments of normal superphosphate exceeded production by 23,000 tons, which reduced stocks on hand at the end of the month to 802,765 tons.

Production	Normal 18% APA Tons	Concentrated 45% APA Tons	Base Goods 18% APA Tons
November, 1945...	651,449	24,893	4,341
October, 1945.....	690,120	15,806	3,179
November, 1944...	551,376	20,250	2,672
Shipments and Used in Reporting Plants			
November, 1945...	674,446	21,370	1,438
October, 1945.....	713,681	17,268	1,375
November, 1944...	559,739	19,107	876
Stocks on Hand			
November 30, 1945.	802,765	33,602	11,771
October 31, 1945...	813,092	30,131	9,112
November 30, 1944.	796,118	29,207	10,316

Boron Needed in Concentrated Fertilizers

At a Maryland farm meeting held in Baltimore on January 9th and 10th, L. E. Scott, professor of horticulture, reporting on observations on the fertilization of vegetable crops, stated that boron deficiencies are more pronounced as the fertilizer becomes more concentrated. This is particularly true on sassafras soils in Maryland.

CASE HISTORY No. 1

No. 1 in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON

	200 lb. Barrels	150 lb. Jute Bags	100 lb. Paper Bags
Container Cost	1.20	.31	.13
Container Cost Per 100 lbs.	.60	.207	.13
Labor Cost	.0250	.0250	.0125
TOTAL COST Per 100 lbs.	.6250	.2320	.1425

CLASS OF PRODUCT PACKED

CEMENT — FERTILIZER ✓
CHEMICALS — FOOD ✓
FEEDSTUFFS — MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE — GRANULAR
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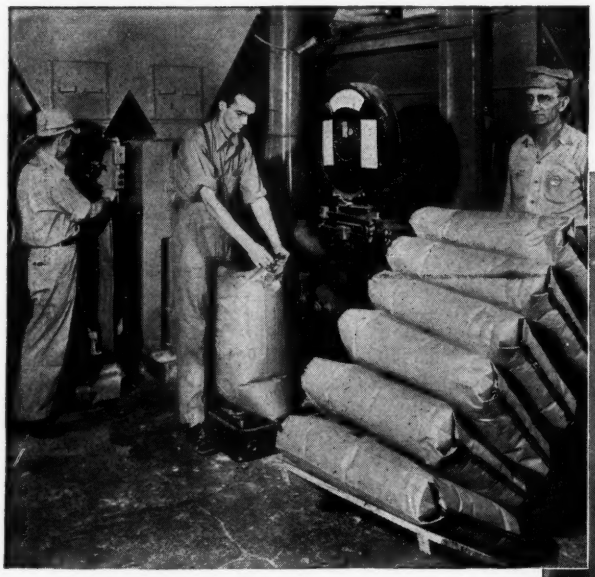
ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speeds, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator.

How MULTIWALLS *doubled* PACKAGING PRODUCTION and halved packaging costs!

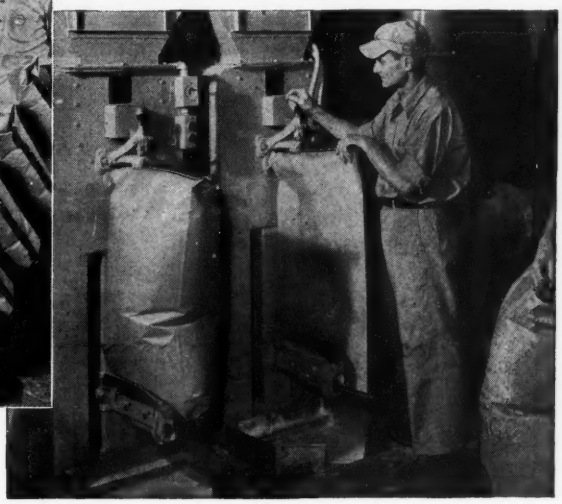
Before this company switched to Multiwall Paper Bags, they were using barrels and jute bags. Three men were needed to fill and weigh these cumbersome containers. These three men were also required for the closing operations. Labor costs were high, while production seldom exceeded 9,000 lbs. per hour.

But, after the installation of Multiwall Bag-filling Machines, it was found that one man could operate 2 filling machines while two other men checked and stacked the bags. This streamline operation results in the packaging of *18,000 lbs. per hour.*

In addition, tight, siftproof Multiwalls overcame problems resulting from siftage, dampness, and infestation. And the compact storage of empty bags provided a substantial saving in valuable floor space.



Left: These 3 men pack, check, and stack 18,000 lbs. per hour in Multiwall Valve Bags. *Below:* Showing the tandem machine arrangement of the St. Regis machines which enables one man to do the bag-filling job.



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Grape Fertilization

Ontario Department of Agriculture Bulletin No. 438 entitled *The Grape in Ontario* presents a very able discussion on the fertility requirements of grapes. Commenting on experimental work, the author states, "Results from a carefully planned fertilizer experiment have shown very little benefit from surface applications of superphosphate and potash, the probable explanation being that the plant roots did not have access to the minerals applied in this way. Further experiments with deep placement of the fertilizers are under way. Taking a long view of the whole fertility problem, fertilizing the green-manure crop appears to be the best method of fertilizing grapes, as in the increased crop residue incorporated in the soil, the plant will have increased nutrients to feed on. Also applying manure, straw, hay, or other crop residue to the vineyard will give the plant an increased food reserve for future growth and fruitfulness.

"The following definite recommendations are based on the various considerations noted above. Farm manure at the rate of 10 tons per acre should be applied at least every other year in order to promote growth of green-manure crops. A supplemental application of 400 lbs. of 0–12–15 per acre, or its equivalent, to balance the mineral requirements is suggested.

"Where farm manure is not available and straw or non-legume hay is used, it should be applied in the fall at the rate of two tons per acre with 150 lbs. of nitrate of soda, or equivalent. This nitrogen application should be divided between fall and spring unless cyanamid is used, when the whole application may be made in the fall. This treatment should be supplemented with about 400 lbs. per acre of an 0–12–15 fertilizer. Where legume hay is used, apply two tons per acre in the fall without nitrogen application but with the usual supplement of 0–12–15 fertilizer. Where a complete fertilizer is to be used, an application of 600 to 800 lbs. of 4–8–10 per acre may be made every other year. This application will give some increase in vine growth and fruitfulness, more especially on light soils."

Fertilizer a Big Factor in Citrus Fruit Development

An article in the *Tampa Morning Tribune* of January 4th by J. A. Murray stresses the part fertilizer has played in the development of the Florida citrus industry. Special recognition is given Dr. A. F. Camp of the Citrus Experiment Station who has directed the citrus experimental work of the station for many years and who is its vice-director in charge. (Dr. Camp has just been named by the *Progressive Farmer* as Florida's outstanding man in agriculture for 1945.)

Fertilizer mixtures that contain not only nitrogen, phosphoric acid, and potash but also include when necessary magnesium, manganese, copper, zinc, boron, and iron, supplemented by proper sprays, are given great credit for the improvement in production and quality of fruit. According to the article, Dr. Camp states that citrus trees handled under the present recommendations for fertilizers and sprays are much more resistant to freezing injury and the fruit is better flavored and contains 25 per cent more solids and vitamins than fruit grown under the old methods.

During 1945 Alabama farmers used 735,000 tons of commercial fertilizer. Of this amount 116,000 tons were superphosphate, 4,100 tons potash, 122,800 tons nitrates, 211,800 tons 4–10–7, and 168,600 tons 6–8–4.

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In addition, Bemis Waterproof Bags prevent caking and are acid-resistant, tear-resistant, puncture-resistant, odorproof, and siftproof.

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Fertilizer Unit Now in Combined Food Board

The fertilizer committee which had been set up during the war under the Combined Raw Materials Board has been made a part of the Combined Food Board and will continue to function, in all probability, until that board is terminated. The Combined Raw Materials Board and the Combined Production and Resources Board ended their activities December 31st, but under announcement of President Truman the Combined Food Board is not scheduled to go out of existence before June 30th.

RAPID SOIL TESTS FURNISH ONE OF THE IMPLEMENTS FOR INCREASING CROP YIELDS

(Continued from page 10)

It has been found that the accuracy of the calcium tests is dependent upon the age of sodium oxalate solution used to precipitate calcium. For best results, a fresh solution is used. Also, sodium oxalate seems to vary from lot to lot, indicating a need of standardizing each new lot of this chemical.

In the magnesium test, Dr. Grubler's Titan Yellow is used. Dr. Grubler's is more sensitive than American sources of this chemical. Of the American sources tried, that of Eastman Chemical Company had the greatest sensitivity. The use of dilute solutions of soil extracts has lessened the effect of interfering substance upon the magnesium test.

In general, accuracy of the nutrient tests has been improved by the use of relatively large amounts of extracts or reagents and the use of the photoelectric colorimeter to measure color or turbidity. The procedures using drops of extracts or reagents are subject to error due to difficulties of accurate measurement. Larger volumes reduce this source of error considerably. One of the greatest single improvements in accuracy has been the utilization of a photoelectric colorimeter. This device is capable of distinguishing between small changes in color or turbidity and is not subject to the individual variation or fatigue of the human eye. The sensitivity of this instrument can be illustrated by the fact that it has pointed out certain inaccuracies in procedure.

Basis of Interpreting Results

Of the three phases of soil testing, that phase dealing with interpretation of results is usually most often subject to inaccuracies. This occurs since the interpretation requires the greatest skill and largest amount of information.

We have found that proper interpretation is dependent not only on the correct determination of an accurate sample, but upon a knowledge of the soil and plant with which one is dealing.

The nature of the soil affects the interpretation of rapid soil test results in many ways. A soil's characteristics will influence the rate of leaching, the amounts of nutrients fixed in an unavailable state, the extent of burning from fertilizer salts, and the amounts of liming materials necessary to obtain a specific change in soil reaction. Information as to nature of the soil along with rapid soil test results must be on hand before deciding on the amounts or kinds of fertilizer, liming materials, or organic matter that need be applied. This information is necessary, also, to decide whether a fertilizer application can be plowed under or needs to be banded, whether side-dressings would be beneficial, and whether it is possible to use one large application in place of several small ones. It can be gathered from the foregoing that the soil is one of the most important factors in determining whether a particular application will give a response.

Much of the knowledge of the South Jersey soils has come from an actual inspection of the field. Information as to drainage, erodibility, variation, suitability for certain crops, presence of hardpan has been gathered from a visual inspection. Knowledge has been gained from fertility experiments in pot and field. Valuable information has been obtained from the determination of base exchange capacity and organic matter contents. The majority of the information has necessarily been collected from an actual study of individual field performance. In doing this, it has been necessary to make correlation studies of crop yields and soil nutrients.

(Continued on page 24)

STEDMAN FERTILIZER PLANT EQUIPMENT

Dependable for more than 50 Years

All-Steel Self-Contained Fertilizer Mixing Units
Batch Mixers—Dry Batching
Pan Mixers—Wet Mixing
Swing Hammer and Cage Type Tailings Pulverizers
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STEDMAN'S FOUNDRY & MACHINE WORKS AURORA, INDIANA, U.S.A. Founded 1834

FERTILIZER MATERIALS
OF FINEST QUALITY — *enable you to produce fertilizers which are dependably uniform in grade*

EXCELLENT
MECHANICAL CONDITION — *saves you time and money in manufacture of your fertilizers*

INTERNATIONAL
Crop-Producing
FERTILIZER MATERIALS

Florida Pebble Phosphate Rock
68% – 70% – 72% – 75% – 77%

Tennessee Phosphate Rock
65% – 68% – 70% – 72%

Montana Phosphate Rock

Superphosphate
Multiple Superphosphate

Domestic Potash Salts

All Standard Grades of Potash
Including SUL-PO-MAG
(Sulphate of Potash-Magnesia)

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Knowledge of Crop Requirements Necessary

We have found that rapid soil tests will have considerable value only after careful correlation between results of rapid soil tests and yields of a particular crop have been made. Such correlation of actual conditions in a local area affords a true value for properly evaluating the results of the tests. It takes into consideration the variation in crop requirements under particular climatic conditions. As a result of such studies, we have found that it is not enough to list a soil as poor, fair, etc., but it is necessary to determine whether a level of nutrients in a soil is satisfactory for lima beans, spinach, etc. Citing an example from our experiences, it has been noted that lima beans can get along nicely with a soluble potassium content of 100 lbs. per 2,000,000 lbs. of soil. If the amount of potassium is raised much above 200 lbs., there seems to be an interference with proper calcium absorption, and a lowered seed-set results. On the other hand, asparagus, with no problem of seed-set, has given the largest yields of high quality with soil contents of potassium near the 400-lb. level. In fact, no diminishing returns of asparagus had set in with the highest potassium content (450 lbs.) and therefore we do not know what is the upper level for this crop.

By such correlations it is possible to establish levels of nutrients which are associated with high yields for various crops. Of course, such levels will vary to a certain extent with the prevailing weather and with the amounts of other nutrients present.

Results from Four Years of Testing

The rapid soil tests as used by the G. L. F.-Seabrook Farms Raw Products Research Division have been valuable in many respects. Generally, they have helped to appraise existing farm practices and to develop new ones. In the latter respect, results of rapid soil tests are an aid in establishing necessary research on new methods of farming. By their results, it has been possible to ascertain what had to be done and rapid soil tests are now being used to check how effectively these new practices are reaching their objective.

Fertilizer Practices that Build Fertility

Prior to the establishment of the Research Laboratory at Seabrook Farms, there was always some question in the minds of the division managers as to whether the fertilizers contained the right analyses or had sufficient minor elements or were applied in sufficient quantities to produce good yields. Any low yields were usually attributed to some deficiency in fertilizer, with all sorts of guesses as to the necessary changes to correct such deficiencies. The laboratory served as an agency to find out why crops were not thriving when they received the same treatment as some adjacent field with a good crop. In practically every case, the reason was some factor other than wrong application of fertilizers. However, these studies have indicated some of the most economical fertilizer practices consistent with good yields.

A large acreage at Seabrook Farms has been acquired during the past 10 years. Many of these farms were in a low state of fertility when acquired. A definite procedure of cover-cropping, liming, and fertilization was inaugurated to make them profitable for operation. Usually the phosphorus, potash, and calcium were low. These farms were cover-cropped with both legume and non-leguminous cover crops. They were limed with dolomitic limestone, and basic fertilizer analyzing 4–12–8 and containing boron and manganese was applied. In addition to the basic fertilizer, cyanamid at the rate of 400 lbs. per acre was plowed under for some pea fields low in fertility and for all spinach fields. For such fields, the fertilizer application then was equivalent to approximately 1,500 lbs. of an 8–12–8. In addition to the above, spinach fields would receive nitrate of soda as side-dressings when needed. This system of fertilizing and liming has served as a definite procedure for growing vegetables and adding to the soil fertility.

Rapid soil tests now show that on some of the older fields, the phosphorus and potash have increased so that we may be able to change this basic fertilizer. The phosphorus supplies have increased to a greater extent than the potash. We are now thinking of using a smaller application of a 10–10–10 in

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place of the 4–12–8. This may eliminate the necessity of a separate application of nitrogen now practiced for cyanamid. It would also appreciably lower the application of phosphorus and reduce the potash somewhat which would be in keeping with existing levels in the field. Preliminary field trials have indicated that this practice will give us more returns for money spent on fertilizer. If this method of fertilization is adopted, we still would need to continue our rapid soil testing to ascertain whether we are maintaining the desired level of fertility.

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(*To be continued in the next issue*)

TOBACCO FERTILIZER EXPERIMENTS IN CONNECTICUT

(Continued from page 14)

Relative Value of Phosphates in Fertilizing Tobacco

Bone phosphates have been the principal sources of phosphorus for tobacco fertilizers in the Connecticut Valley. Because of the scarcity of precipitated bone and steamed bone meal, a search for suitable substitutes was begun in 1940. The investigations were conducted by T. R. Swanback, H. A. Lunt and P. J. Anderson, and included triple superphosphate, calcium metaphosphate, potassium metaphosphate, and potassium calcium metaphosphate. These were tested in check plots, in comparison with precipitated bone, steamed bone, and no phosphorus, for the four years 1941–1944. In the "no phosphorus" plots the nitrogenous organic materials used to supply nitrogen also contained about 16 pounds of P_2O_5 per acre. In the other plots the fertilizer contained 116 pounds of P_2O_5 per acre.

The results were measured by yield in pounds per acre, grade index indicating quality of crop, and crop index (pounds per acre times grade index). The results of the four-year test are summarized as follows:

	Yearly Average Pounds per Acre	Average Grade Index	Crop Index	Relative Crop Index
No phosphorus.....	1959	.404	792	100.0
Precipitated bone...	2026	.400	810	102.3
Steamed bone.....	2004	.410	822	103.8
Triple superphosphate.....	2067	.414	855	108.0
Calcium metaphosphate.....	2084	.416	868	109.6
Potassium metaphosphate.....	1921	.406	780	98.5
Potassium calcium metaphosphate...	1830	.481	765	96.6

These results indicate that from the standpoint of yield, both triple superphosphate and calcium metaphosphate gave significant increases over the bone fertilizers normally used in this territory. These results have been duplicated by growers who have tried these forms of phosphates.

Nitrogen in Irrigation Water

As the rainfall during the summer of 1944 was the lowest in many years, several irrigation experiments were conducted. Irrigation is used little in the Connecticut Valley, even though the records show that during the past 15 years there have been seven summers when the tobacco crop has suffered from drouth. Former attempts at irrigation have not been too successful as growers have found that merely flooding the field with water often impaired, rather than improved, the crop.

In the 1944 tests, comparison was made between non-irrigated plots, plots irrigated

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See Page 4

with water only, and plots in which nitrate of soda was added to the water. In the non-irrigated plots the tobacco had short leaves of poor elasticity and color and no quality. Many showed the typical symptoms of nitrogen starvation. In the plots irrigated without nitrate the leaves were larger but many were yellow and lifeless. In the plots in which nitrate of soda was added to the water at the rate of 400 lb. per acre over the irrigating period, the leaves were of the best size, color and quality, with no yellow leaves. Care must be taken not to add too much nitrogen as this results in color too dark and veins too prominent. The yield and grading records were as follows:

	Yield lb. per Acre	Grade Index	Crop Index	Relative Crop Value
Not irrigated.....	1526	.255	389	100
Irrigated only.....	1726	.297	513	132
Irrigated and nitrated.....	1990	.381	758	194

WORLD FERTILIZER SITUATION CRITICAL

(Continued from page 8)

of nitrogen and though the great bulk of this was required for home consumption, Japan was able to make some exports to the Far Eastern countries. If the bulk of this capacity is intact a sufficient export tonnage should be obtainable from this source to meet the immediate requirements of China, Dutch East Indies, etc. This matter is now under investigation.

Fertilizers in Short Supply

The two most serious shortages are nitrogen and phosphates, and to a lesser extent potash.

Since Europe was the leading world producer of nitrogen in the prewar period, with large tonnages available for export, shortages in that area are particularly acute. Now Europe cannot produce sufficient nitrogen to supply her own needs. To maintain even minimum crop production levels Europe must import nitrogen. In the last analyses she can only obtain the needed supply from the countries that have a net exportable supply, which is from Chile, Canada, Norway, and the United Kingdom. Exports from the United States must be made up by imports from other countries. Although additional nitrogen became available after V-E and V-J Days, when the need for nitrogen in the manufacture of munitions ceased, this was limited by the capacity for the conversion of ammonia into fertilizer forms and was not in sufficient quantity to offset new deficiencies in liberated countries. The problem of supplying nitrogen to Europe is perhaps the gravest problem in the production of food crops in 1946.

The shortage of phosphates for 1945–46 grows, in part, out of the fact that the program of phosphate rock production in North Africa is running behind the schedule of 4,000,000 tons. In view of the shortage of phosphates in war-torn Europe, the need to successfully carry through the North African rock phosphate program is urgent.

In spite of the fact that current demand for soluble phosphates in North America is greater than the visible supply, considerable quantities have been scheduled for export. The Canadian production of ammonium phosphates, both the 16–20–0 and the 11–48–0, has increased during the war years to a total of about 175,000 tons per annum, about 140,000 tons of which is shipped out of the country. The United States is exporting the same quantity of triple superphosphate as last year and considerable additional supplies of ordinary superphosphate.

Fundamentally, however, the phosphate problem is one of getting rock to each consuming country and having it processed there into soluble forms since the tonnage of soluble phosphates available for international allocation is small relative to world phosphate requirements.

Due to the successful efforts of the American potash producers in increasing production to some 790,000 tons K_2O for agricultural purposes for 1945–46, the shortage of this essential element is not so serious—although the demand in North America still exceeds the supply and there will be some areas of potash shortage in 1946. Fortunately in Europe the French mines are again in production and exports are being made to European countries. But European requirements will not be adequately met unless supplies from

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Germany are available, either through reparations or otherwise, and there is yet no assurance of this. It is considered urgent that at least stocks on hand in Germany be distributed before next spring. On the other hand, in marked contrast with phosphates, European soils have been well supplied with potash during the war years, so that generally speaking, a potash shortage in 1945–46 will not be as serious as a shortage of either of the other fertilizer elements. It will be a great help to the Board when more accurate data regarding fertilizer supplies for eastern Europe become available.

Means of Dealing with Shortages.—There are two broad methods of meeting conditions of shortage:

(a) Raise production to the maximum and ship materials from surplus supply areas to the deficient areas.
(b) Reduce the general level of plant food consumption in all countries.

There are, of course, practical limits beyond which either policy cannot be implemented for 1945–46. Both emphasize the necessity for maintaining the greatest possible equity in distribution on the basis of agricultural needs and humanitarian interests.

Factors Causing Shortages and Inequitable Distribution

Among a number of causes for the over-all shortage of fertilizer materials a lack of adequate power is fundamental. Power depends on coal. Coal is in very short supply. It seems certain that sufficient coal will not be available for industrial production in the winter of 1945–46 and one effect of this is the quite inadequate European nitrogen supply.

It is primarily owing to this coal shortage that countries like Belgium, France, and the Netherlands, which before the war were either self-supporting or had considerable export surpluses, are required to import large tonnages of nitrogen in 1945–46. This European coal shortage is, in fact, the biggest single factor in the world nitrogen deficiency.

In North Africa an extreme drought has reduced the hydroelectric power, and the lack of adequate coal supply is also adversely affecting the program to produce 4,000,000 tons of rock phosphate, which is urgently needed. This production program is running behind schedule. As already noted, the principal phosphate rock producing islands of Oceania, though now liberated from the Japanese, have suffered severe damage and will not be in full production for several years.

International Transportation.—The wartime destruction of normal internal transportation in Europe is another adverse factor affecting fertilizer production and distribution. Reports indicate, however, that transportation is improving slowly.

Shipping.—Since V-J Day there has been a marked improvement on ocean shipping available for moving fertilizer materials. This is very fortunate as it will enable the lifting of all the 1,980,000 short tons of nitrate of soda available in Chile. It should also permit the free movement of phosphate rock from North Africa.

Production and Allocation

As of October 1, 1945, a total of approximately 6,680,000 tons of N, P_2O_5, and K_2O were allocated to some 80 countries. In spite of increases in fertilizer production since the end of hostilities, however, there is today an estimated shortage of at least 1,000,000 tons of actual nitrogen, phosphates and potash. This figure does not take into consideration the requirements of the Far East, where among other materials nitrogen is needed for rice and other crops.

Recommendations to Insure the Equitable Distribution of Fertilizers

Consideration has been given to the problem of how best to ameliorate the impact of fertilizer shortages on world crop production programs in 1946. In view of all the facts available to the Combined Food Board, the following recommendations are made:

(a) That allocations of fertilizers for international trade be continued during the fertilizer year 1945–46.
(b) That such controls as export licenses and other measures now in effect to guide the international movement of fertilizers be retained.

While it is highly desirable that all controls be removed as quickly as possible, the Combined Food Board is of the opinion that failure to retain such measures at this time would lead to severe regional shortages of fertilizers and gross inequities of distribution. There would be extreme uncertainty and confusion in the movement of fertilizer materials in international channels which would be dominated by the relative level of highest prices rather than the urgency of need. For these reasons the Board feels that international control of fertilizers should be continued until such time as the world supply position has eased, and it is no longer necessary to make allocations to adjust the demand/supply position in the best interests of United Nations food supplies.

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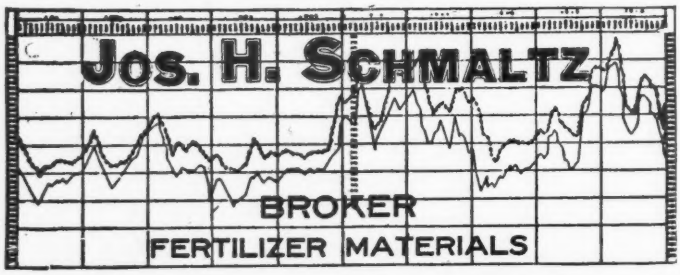

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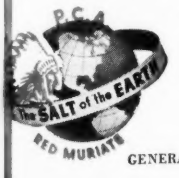

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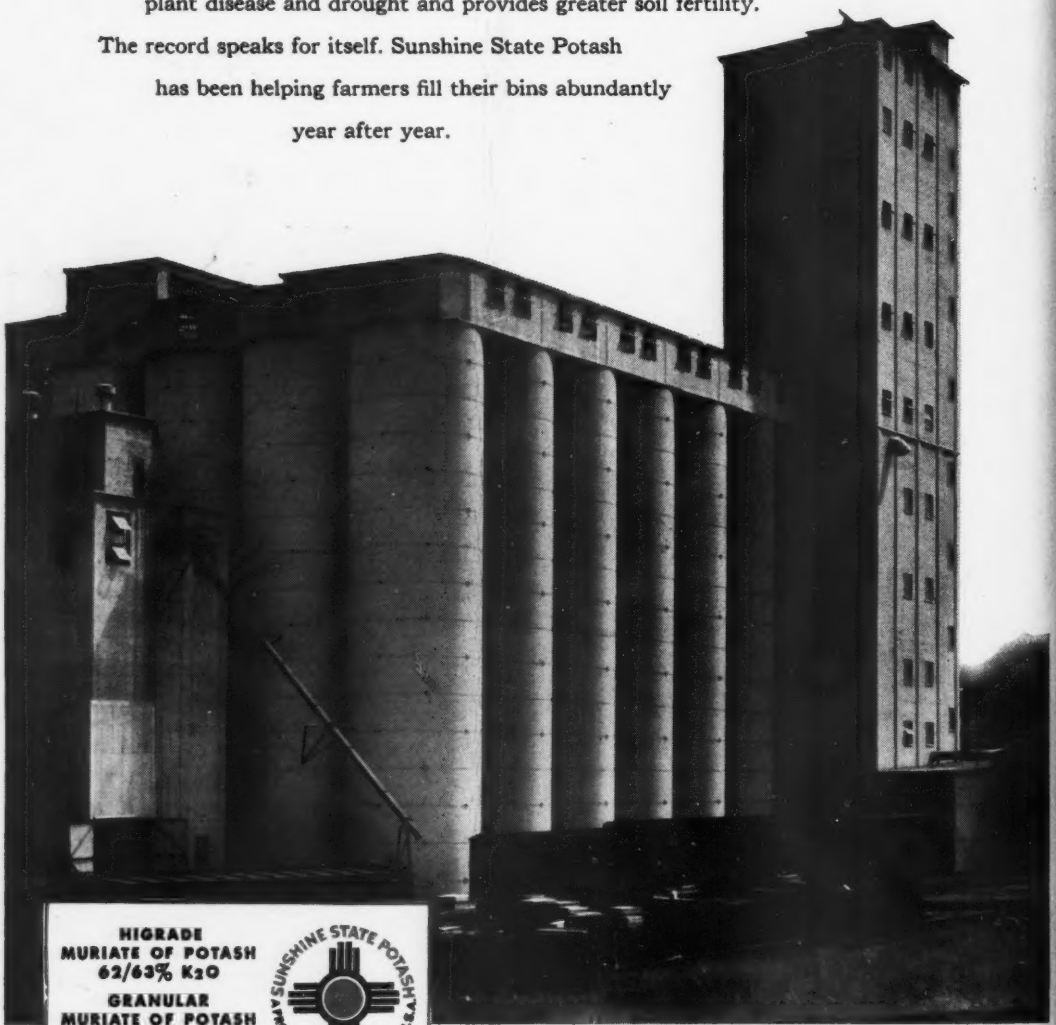

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